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# Cassiar Timber Supply Area

## Rationale for Allowable Annual Cut (AAC) Determination

**Effective January 1, 2002**

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**Chief Forester**

# Table of Contents

Objective of this document ..... 3
Description of the TSA ..... 3
History of the AAC ..... 4
New AAC determination ..... 4
Information sources used in the AAC determination ..... 5
Role and limitations of the technical information used ..... 6
Statutory framework ..... 6
Guiding principles for AAC determinations ..... 6
The role of the timber supply analysis ..... 9
Timber supply analysis for the Cassiar TSA ..... 10
Consideration of Factors as Required by Section 8 of the *Forest Act* ..... 12
Land base contributing to timber harvesting ..... 12
- general comments ..... 12
- operability ..... 12
- sites with low timber growing potential ..... 14
- parks ..... 14
Existing forest inventory ..... 14
- volume estimates for existing natural stands ..... 15
Expected rate of Growth ..... 15
- site productivity estimates ..... 15
- Operational Adjustment Factors ..... 16
- minimum harvestable ages ..... 17
Expected time for forest to become re-established on the area following denudation ..... 17
Silvicultural treatments to be applied ..... 17
Timber harvesting ..... 17
Integrated resource management objectives ..... 18
- cutblock adjacency and green-up ..... 18
- visual quality objectives ..... 19
- recreation ..... 19
- riparian habitat ..... 19
- wildlife habitat ..... 20
- landscape level biodiversity ..... 22
- stand level biodiversity ..... 23

Other information that relates to the capability of the area to produce timber ..... 23
- Cassiar Iskut Stikine Land and Resource Management Plan (CISLRMP) ..... 23
Alternative rates of harvest ..... 24
Community implications ..... 26
Timber processing facilities ..... 26
- existing mills ..... 26
- proposed facilities ..... 27
Minister's letter and memorandum ..... 27
Local objectives ..... 27
Unsalvaged losses ..... 28
- insects and disease ..... 28
- fire ..... 28
Reasons for Decision ..... 29
Determination ..... 32
Implementation ..... 33
Appendix 1: Section 8 of the *Forest Act* ..... 34
Appendix 2: Section 4 of the *Ministry of Forests Act* ..... 36
Documents attached: ..... 36
Appendix 3: Minister of Forests' letter of July 28, 1994 ..... 36
Appendix 4: Minister of Forests' memo of February 26, 1996 ..... 36
Appendix 5: Summary of Public Input ..... 36

## Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Cassiar Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

## Description of the TSA

The Cassiar Timber Supply Area (TSA) is situated in the northwest corner of the province in the Prince Rupert Forest Region. This TSA is the largest in British Columbia at over 14.8 million hectares, covering approximately one-sixth of the province. The Cassiar TSA is administered from the Bulkley/Cassiar forest district office in Smithers, with a field office in Dease Lake.

The Cassiar TSA is bordered to the west by Alaska, to the north by the Yukon Territory, to the east by the Fort Nelson and Mackenzie TSAs, and to the south by the Nass and Prince George TSAs. In the west, the Cassiar TSA consists of rugged, ice-capped mountains, dissected by several major river valleys. East of this, the majority of the TSA is characterized by mountains and plateaus separated by wide valleys and lowlands.

Forests in the Cassiar TSA range from areas of coastal forest in the west, to extensive areas of boreal forest in the majority of the TSA. Lodgepole pine and white and black spruce are the predominant tree species in the Cassiar TSA forests. Lodgepole pine dominates 49 percent of forest stands within the timber harvesting land base, mainly in the northern part of the TSA. Spruce dominates 47 percent of the timber harvesting land base, mainly in the southern portion of the TSA. In a small portion of the area, subalpine fir is predominant.

Of the entire TSA, approximately 2 591 000 hectares are not managed directly by the BCFS, including parks, ecological reserves, private land and various special use permit areas. An additional 8 501 000 hectares are considered non-productive or non-forested, including rocks, swamp, alpine areas and water bodies. Productive Crown forest land managed by the BCFS is about 3.7 million hectares, or 25 percent of the TSA. Of the productive forest, about 200 000 hectares, or 1.3 percent of the total TSA land base, is available for harvesting under current management considerations and objectives.

Numerous natural resources are associated with the forest land base, many of which are undeveloped and located in inaccessible areas of the TSA. These resources include forest products, minerals, recreation and tourism amenities, and wildlife habitat. The Cassiar TSA is one of the finest big-game trophy hunting areas in North America. Recreational activities include hiking, canoeing, rafting, kayaking, fishing and nature viewing. Several provincial parks — Atlin Lake, Stikine Recreation Area, Spatsizi Plateau, Mount Edziza and Tatshenshini-Alsek — offer outstanding backcountry wilderness experiences and draw international recognition to the area's wilderness values.

The Cassiar TSA is the least populated TSA in the province, with a population of about 2000 in 1996. The communities in this TSA include Dease Lake, Atlin, Iskut, Telegraph Creek, Good Hope Lake and Lower Post.

## History of the AAC

The boundaries of the Cassiar TSA were established in 1980. An inventory database was compiled in 1983, and in 1984 the first AAC was set at 140 000 cubic metres. In 1995 the chief forester determined a new AAC of 400 000 cubic metres, effective January 1, 1996. The AAC was partitioned to the following supply blocks:

- Iskut and Boundary supply block – 240 000 cubic metres
- Dease - Liard supply block – 120 000 cubic metres
- Atlin supply block – 40 000 cubic metres

The AAC is currently apportioned by the Minister as follows:

| | Cubic Metres | percent of AAC |
|---|---|---|
| Forest Licences Non-Replaceable | 120 000 | 30.0 |
| Small Business Forest Enterprise Program | 2 500 | 0.6 |
| Forest Service Reserve | 12 500 | 3.1 |
| Subtotal (allocated) | 135 000 | 33.8 |
| Unallocated | 265 000 | 66.2 |
| **Total = current AAC** | **400 000** | **100** |

## New AAC determination

Effective January 1, 2002 the new AAC for the Cassiar TSA will be 305 000 cubic metres, a reduction of 95 000 cubic metres from the current AAC.

Within the AAC partitions are specified to the following supply blocks:

- Iskut and Boundary supply block – 120 000 cubic metres
- Dease - Liard supply block – 153 000 cubic metres
- Atlin supply block – 32 000 cubic metres

The partitions are discussed below in 'alternative rates of harvest'.

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

## Information sources used in the AAC determination

Information considered in determining the AAC for the Cassiar TSA includes the following:

- *Cassiar TSA Data Package and Information Report*, BCFS, November, 1999;
- *Cassiar TSA Analysis Report and Public Discussion Paper*, BCFS, March, 2001;
- Cassiar TSA Summary of Public Input on Data Package and TSA Analysis Report, BCFS, June, 2001;
- Cassiar Iskut Stikine Land and Resource Management Plan, October, 2000;
- Gap disturbances in northern old-growth forests of British Columbia (DRAFT), Coates et al, 2001;
- Species variability in growth response to light across climatic regions in northwestern British Columbia, 1998;
- Natural Disturbance and Timber Supply Estimates for the Cassiar Iskut Stikine LRMP, Olivotto Timber, January, 1999;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS, including the AAC determination meeting held in Smithers, June 6 and 7, 2001;
- *Cassiar TSA Rationale for AAC determination*, BCFS, January, 1996;
- *Cassiar TSA Timber Supply Analysis*, BCFS, August, 1994;
- *Cassiar TSA Socio-Economic Analysis*, November, 1994;
- *Forest Practices Code of British Columbia Act*, consolidated to March 2001;
- *Forest Practices Code of British Columbia Act* Regulations and Amendments, current as of March 2001;
- Forest Practices Code of British Columbia Guidebooks, BCFS and MELP;
- *Cassiar TSA Inventory Audit*, BCFS Inventory Branch, December 1997;
- *Identified Wildlife Management Strategy*, February 1999;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- *Higher Level Plans: Policy and Procedures*, BCFS and MELP, December 1996.

## Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Cassiar TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

## Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 is reproduced in full as Appendix 1.

## Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were originally approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although implementation of the Forest Practices Code has been underway since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC

determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

In the Cassiar TSA, government's approval of the Cassiar Iskut Stikine Land and Resource Management Plan (CISLRMP) in 2000, and decisions on protected areas, have clarified many aspects of land and resource use and management. The Cassiar Iskut Stikine Higher Level Plan Order has been advertised and is awaiting designation by Cabinet. The implementation of this Higher Level Plan will provide further certainty regarding resource management in the area.

Forest Renewal British Columbia (FRBC) has funded a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long-term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of

harvesting activity within the Cassiar TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

With respect to future treaty decisions, as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government. I am aware that the Tahltan, Kaska Dena, Tlingit, Carcross Tagish and Champagne-Aishihik First Nations have asserted traditional territories within the Cassiar TSA. Any decisions on treaty negotiations with First Nations in the Cassiar TSA that are undertaken by government will be reflected in future AAC determinations for the TSA.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of my responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

**The role of the timber supply analysis**

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Stand Simulator, or FSSIM), a series of timber supply forecasts is produced, reflecting different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change

during periods of legislative or regulatory change, such as the enactment of the Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis for the Cassiar TSA

The base case harvest forecast presented in the *March 2001 Cassiar Timber Supply Area Analysis Report* incorporated the best available information on current forest management, land base and timber yields for the TSA. It included specific assumptions related to timber harvesting operability, unsalvaged losses, the forest inventory, wildlife habitat, site productivity, and biodiversity. These and other assumptions are discussed in detail in the timber supply analysis report.

In this rationale, I will discuss many of these assumptions in the context of my considerations for this AAC determination. However, where my review of an assumption has concluded that I am satisfied it was appropriately modelled in the base case of the timber supply analysis, then I may not discuss my considerations in detail in this rationale, other than to note my agreement with the approach that is already documented in the timber supply analysis report. Some appropriately modelled factors, though, may still warrant discussion for reasons such as a high level of public input or lack of clarity in the analysis report and I may chose to provide my consideration of such factors in this rationale.

A base case harvest forecast was generated which incorporated the factors appropriate to the TSA, and this base case was submitted for public review. This base case projected that the current AAC of 400 000 cubic metres per year could be maintained throughout the entire 250 year planning horizon.

The base case for the 2001 timber supply analysis incorporates several different assumptions from the base case that was generated in the analysis for the 1996 AAC determination. In overview, it includes the following:

an operability assessment which has led to a substantial reduction in the area considered operable, accessible, and feasible to harvest;

- the exclusion from the timber harvesting land base of areas that could be harvested by helicopter and cable systems, as well as areas with marginal operability or low volumes;
- more complete accounting for implementation of the Forest Practices Code and exclusion of forest to account for riparian reserves and wildlife tree patches;

- a review of fire history and an increase in the estimate of unsalvaged losses due to fire and insects;
- newly available biogeoclimatic ecosystem classification (BEC) mapping for land base delineation and evaluating old-forest requirements;
- stream buffers for riparian values, slope, and wildlife habitat mapping were used to account for environmentally sensitive areas (ESAs) for those mapsheets with no ESA information; and
- a revised approach used to model forest cover requirements for wildlife habitat.

There were specific considerations consistent with current timber supply review policies that led to the choice of the base case harvest forecast. These included establishing an initial harvest level at the current AAC, and providing for an orderly transition from harvesting existing natural stands to future managed stands. In addition to the base case harvest forecast, a reference forecast was produced in which the starting level was set at maximum achievable non-declining even-flow. This forecast, the maximum even-flow projection, did not consider the current AAC when establishing the initial harvest level, and projected that an initial harvest level of 441 000 cubic metres per year could be maintained throughout the entire 250 year planning horizon. This projection showed greater sensitivity to changes in input data, relative to the base case, and for this reason was used as the basis for all sensitivity analysis.

For the purpose of determining this AAC for the Cassiar TSA I have relied in part on the base case projection of timber supply, sensitivity analysis applied to the maximum even-flow projection, and also on several related forecasts, in accordance with my assessments of the validity of the assumptions incorporated in the projections. In particular, as discussed in 'alternative rates of harvest', and 'Cassiar Iskut Stikine Land and Resource Management Plan', I have relied on a projection representing the maximum even-flow by supply block and a projection incorporating a combination of changed assumptions arising from the Cassiar Iskut Stikine LRMP (CISLRMP). I am satisfied that these forecasts provide a suitable basis from which to assess available timber supply in the TSA. I have also considered all public input received on the data package and analysis report, and where appropriate I have discussed my considerations under the various factors presented in this rationale.

## Consideration of Factors as Required by Section 8 of the *Forest Act*

**Section 8 (8)**

**In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider**

**(a) the rate of timber production that may be sustained on the area, taking into account**

**(i) the composition of the forest and its expected rate of growth on the area**

Land base contributing to timber harvesting

*- general comments*

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social (e.g. parks) reasons. In the Cassiar TSA, the deductions (summarized in table 2 of the March 2001 *Cassiar Timber Supply Area Analysis Report)* result in a timber harvesting land base of 198 768 hectares, or approximately 5 percent of the Crown productive forest land.

I have considered all of the deductions applied in the derivation of the timber harvesting land base. Those factors associated with the derivation of the timber harvesting land base for which, based on my thorough review, I accept the assumptions as modelled in the analysis are not discussed below. These factors include environmentally sensitive areas and estimates for roads, trails and landings. Where my consideration of the information has identified a factor which in my estimation requires discussion in this document, it is described below.

*- operability*

Those portions of the TSA that are neither physically operable nor economically feasible to harvest are categorized as inoperable, and are excluded when deriving the timber harvesting land base. There is some uncertainty regarding accessibility and merchantability because of the lack of experience with timber harvesting in the Cassiar TSA. The average annual harvest over the period 1990 to 1999 has been about 58 000 cubic metres. In 1998 and 1999 the harvest was 1417 cubic metres and 1681 cubic metres, respectively. In response to this uncertainty and to issues identified when the AAC for the TSA was determined in 1996, district staff undertook fieldwork in 1998, 1999 and 2000 to better define the timber harvesting land base. The district operability review examined which stands, based on their physical location and characteristics, should be included as part of the timber harvesting land base. For the timber supply analysis, a total of 1 954 577 hectares, or approximately 53 percent of the Crown productive forest, was excluded as inoperable based on operability mapping. Since the analysis, district staff have flown several helicopter reconnaissance flights throughout the TSA. They have re-assessed operability and removed 19 888 hectares from the estimate of the timber harvesting land base. This accounts for scattered patches of forested land which are considered to be inoperable as it is not economically feasible to harvest these stands in the foreseeable future.

District staff has also identified a number of inaccuracies in the mapping of the timber harvesting land base that they conclude has over-estimated the timber harvesting land base. As part of the timber supply analysis, sensitivity analysis was conducted to assess the impact on timber supply of an overestimation in the size of the timber harvesting land base. Sensitivities examined the implications of ten and forty percent overestimates. The results of the ten-percent overestimate sensitivity indicate that the timber supply projection would be ten percent lower than projected in the maximum even-flow projection. The results of the forty- percent overestimate sensitivity indicate that the long-term harvest level would be forty percent below the maximum even-flow projection.

I have reviewed the mapped representation of the timber harvesting land base for the TSA. I understand that specific polygons on the maps are an approximation and not an exact representation of the timber harvesting land base, but I am satisfied that the district's operability review provides the best available information in view of the small amount of harvesting history to assist in this definition. Having stated this, I am mindful that the timber harvesting land base used in the 1994 timber supply analysis was significantly larger. The revised operability estimate and the further land base correction since the most recent analysis was completed has resulted in a significant reduction in the size of the timber harvesting land base. This results in a downward pressure on timber supply, and I have accounted for this in my determination as discussed in 'Reasons for Decision'.

The TSA is divided into six timber supply blocks. Two of the six timber supply blocks the Alsek and the Kechika are not considered as contributing to the timber harvesting land base. These two timber supply blocks are marginally forested, and are remote and inaccessible. These blocks cover a significant amount of the total area in the Cassiar TSA and contribute to supporting numerous plant and wildlife species. The remaining four supply blocks: Iskut, Boundary, Dease-Liard, and Atlin were examined and only areas that were economically and physically accessible were considered as the timber harvesting land base. The Iskut and Boundary are treated as one supply block and share one partition because they occur in very similar physiographic units and, when harvested, will share a common transportation system. In my considerations and the following discussion, I refer to three supply blocks, defined as the Iskut and Boundary supply block, the Dease-Liard supply block and the Atlin supply block.

In the analysis, pulpwood stands were excluded from the timber harvesting land base. Public comment received from BC Spaces supported exclusion of pulpwood stands as they were considered to be uneconomic. Other input was that exclusion of pulpwood stands may be too conservative as in the early 1990s similar stands were harvested in the Iskut supply block and adjacent TSAs. District staff have informed me that, since the analysis, an offer has been made for a non-replaceable forest licence in the Iskut supply block. Part of the requirements of the licence is to harvest the forest profile, including the pulp component. The area of pulp leading stands in the Iskut supply block that could contribute to the timber harvesting land base is 8 615 hectares. I am mindful that there is no recent performance in these pulp stands since the 1990s but also that a non replaceable forest licence has been offered which includes harvesting in these types. I view these stands as providing an upward pressure to timber supply and have considered this in my determination as documented in 'Reasons for Decision'.

During the analysis, a number of balsam leading stands were inadvertently classified as pulp stands and were excluded from the timber harvesting land base. Staff have determined that 8 153 hectares of merchantable balsam leading stands should have been included. Balsam leading stands occur predominantly in the Iskut supply block, and accordingly I consider the inclusion of the balsam stands to be an upward pressure on timber supply available from the Iskut and Boundary supply blocks. I have considered this in my determination as documented in 'Reasons for Decision'.

The analysis also inadvertently included in the timber harvesting land base an area to the south of Atlin. This area is 1 645 hectares and its removal from the timber harvesting land base is a downward pressure on timber supply in the Atlin supply block. I have considered and accepted this in my determination as documented in 'Reasons for Decision'.

I expect that, as harvesting operations take place in the TSA, the experience gained will help to more accurately define operability and the timber harvesting land base and help reduce uncertainty in the size of the timber harvesting land base for the next determination.

*- sites with low timber growing potential*

The harvesting of forest stands on site of low productivity is highly dependent on economics. Sites with low timber growing potential are defined as those sites with mature stands less than or equal to height class 2 or less than 220 cubic metres per hectare of volume, and those sites with immature stands that are unlikely to achieve minimum volume or height criteria upon maturity. In the analysis, 1 191 372 hectares were excluded from the timber harvesting land base for sites with low timber growing potential. I note that the minimum site index criteria and minimum volume criteria are higher than for many comparable areas elsewhere in the province, but I am satisfied that criteria used are reasonable because of the long distance to markets and other unique challenges faced in the Cassiar.

*- parks*

The analysis was completed before government approved the Cassiar Iskut Stikine LRMP. As a result the timber harvesting land base did not exclude new parks that were created as a result of the LRMP. Staff have advised me that, with the exception of 236 hectares, all of the new parks occur outside of the current timber harvesting land base. I consider this to be a small downward pressure on timber supply that I discuss further under 'Cassiar Iskut Stikine Land and Resource Management Plan'. I am satisfied that I have fully accounted for parks in this determination.

<u>Existing forest inventory</u>

The inventory data used for the timber supply analysis is based on forest inventories completed in the early 1970s and projected to 1999. For the analysis, the inventory file was updated to 1993 to account for changes in ownership, growth, and denudation through harvesting or fire. Staff estimate that, in the period from 1993 to 2001, approximately 520 hectares of harvesting and fire disturbance within the timber harvesting landbase have not been updated. This will result in a very small over-estimate of the volume of existing mature timber on the timber harvesting land base, but I consider this to not have a significant effect on the analysis. I have considered the information about the existing forest inventory, and am satisfied that the best available

information was used in the analysis. I note, however, that much of the inventory is over 30 years old, and this introduces an element of uncertainty into my determination.

*- volume estimates for existing natural stands*

A statistical audit of the Cassiar TSA inventory was carried out in 1997 and was based on the timber harvesting land base identified in the 1995 timber supply analysis. The objective of the inventory audit was to assess the overall accuracy of the current forest inventory and 70 audit samples were installed. The timber harvesting land base for the 2001 analysis is significantly different from that of the earlier analysis and the audit was re-compiled to correspond with the new timber harvesting land base and re-stratification of the TSA from southern and northern to coastal/transitional and interior. The re-stratified statistical audit indicates that the inventory over-estimates existing stand volumes by 14 percent in the coastal/transitional areas and by 49 percent for interior areas. Staff undertook a sensitivity analysis to assess the implications of the re-stratified audit results on the maximum even-flow harvest level. The highest even-flow forecast that could be maintained using the re-stratified audit results was 370 500 cubic metres per year. This amounts to a 16 percent reduction from the maximum even-flow projection, of which 15 percent is attributable to the interior strata and 1 percent is attributable to the coastal/transitional strata.

I have examined the method by which both the original audit and the re-stratified audit were compiled. I am aware that the re-stratified audit used a subset of the original audit samples. Taking the original sample design and disaggregating it into summaries introduces a great deal of uncertainty around the audit ratios. However, the re-stratified audit does indicate that the inventory estimates are over-estimated relative to ground samples. The timber supply forecast is sensitive to existing stand volume estimates and I have considered the implications of over-estimates of existing stand volumes in my determination. This is discussed further under 'Reasons for Decision'.

Expected rate of Growth

*- site productivity estimates*

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

In general in British Columbia, site indices determined from younger stands (i.e. less than 31 years old), and older stands (i.e. over 140 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study—as well as results from using the Site Index Biogeoclimatic Ecosystem Classification

System (SIBEC) suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. Such studies indicate that site productivity has generally been underestimated by the inventory file data. In general, managed stands in the province tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

Two recent studies of site productivity are applicable to the Cassiar TSA. In 1998, Prince Rupert Forest Region research staff established 108 SIBEC plots within the TSA. Using this data managed stand volumes and minimum harvestable ages were re-calculated, based on average adjusted site productivity. This information was incorporated into a sensitivity analysis that indicates that the maximum even-flow harvest forecast could be increased by 4 percent. Although the data indicate an increase in potential harvest levels, the scale of the biogeoclimatic ecosystem classification inventory used is based on the 1:250 000 variant level, to which SIBEC results are not directly applicable. In order to make the results more applicable, the regional ecologist from the Prince Rupert Forest Region estimated that the site breakdown of analysis units by BEC subzone is 80 percent mesic and 20 percent rich. There are also significant uncertainties around the accuracy of the biogeoclimatic classification that has occurred to date in the Cassiar TSA. District staff have indicated that significant areas that are currently mapped as Spruce Willow Birch should in fact be Englemann Spruce Subalpine Fir or one of the boreal Biogeoclimatic Ecosystem Classification variants.

The second study in the Cassiar TSA was the 1997 inventory audit. The mean audit site index from ground sampling was compared to the site index derived from forest inventory files. There were negligible differences for the coast/transition analysis units, but a significant 13 percent over-estimate in site index for interior analysis units. Staff assessed the impact of incorporating revised site index estimates based on the re-stratified audit data. The assessment indicated that the maximum even-flow harvest forecast declined by 11.7 percent. Staff have informed me that there is uncertainty around this forecast due to the nature of the individual trees that were measured for site index derivation during ground sampling for the inventory audit. These trees may have been not ideally suited for site index derivation because they were significantly greater than 150 years old, or because they were damaged or suppressed.

In examining the data presented to me, I note that there is a conflict between a 4 percent underestimation of timber supply on the one hand and an 11.7 percent overestimation of timber supply on the other. I am mindful of the possibility of an underestimate creating an upward pressure due to SIBEC. I am also mindful of the possibility of an overestimate creating a downward pressure on timber supply due to an overestimate of site index identified by the inventory audit. If there was a consistent overestimate or underestimate then I could apply that in my determination, however there is no consistency. Both are based on a reasonable application of the information at hand, and both contain significant amounts of uncertainty and risk. I will therefore make no adjustments to the analysis for site productivity, and I ask that staff explore this issue further so that there is clarification for the next Timber Supply Review.

*- Operational Adjustment Factors*

Operational adjustment factor 1 (OAF1) is a constant percentage reduction to managed stand yield tables to account for small unproductive areas within stands, uneven stem distribution and endemic losses that do not increase with age. Operational adjustment factor 2 (OAF2) is an

increasing reduction to account for losses that increase with stand age, such as decay due to disease. The provincial standard for OAF 1 is 15 percent and 5 percent for OAF 2.

In the 1995 Cassiar AAC determination I accepted that a higher OAF1 was necessary to account for unique northern conditions such as a short growing season, severe climate and soil limitations. At that time I asked staff to examine the implications of northern conditions on tree growth. I have reviewed 1998 research into species variability in growth response to light across climatic regions in northwestern British Columbia which indicates that there are no extreme reductions in growth occurring in boreal forests, as compared to more southern areas, as has been suggested in the past. Growth rates in the boreal forest in the Cassiar TSA are comparable to other subzones within the Prince Rupert Forest Region. Based on this research, the base case analysis used the standard provincial OAF1 estimate.

District staff expressed concern about the clumpy nature of natural regeneration on harsher sites in the TSA. I have reviewed the results of a recent study (*Gap Disturbances in Northern Old-growth Forests of British Columbia*) that indicates that in the Cassiar TSA there are a higher proportion of edaphic gaps than the provincial average, (e.g. swamps, and vegetative gaps, or canopy openings associated with established shrub communities). I have reviewed this information and have accepted a downward pressure on timber supply of 3 percent arising from forest gaps in the Cassiar TSA. I have discussed this further in 'Reasons for Decision'.

- *minimum harvestable ages*

I have reviewed the information regarding minimum harvestable ages, and I am satisfied that this factor was appropriately modelled in the analysis.

**(ii) the expected time that it will take the forest to become re-established on the area following denudation**

Expected time for forest to become re-established on the area following denudation

I have reviewed the information regarding regeneration delay and not satisfactorily restocked areas, and I am satisfied that the assumptions used in the analysis for these factors were appropriate.

**(iii) silviculture treatments to be applied to the area,**

Silvicultural treatments to be applied

I have reviewed the information regarding silvicultural systems and incremental silviculture, and I am satisfied that the assumptions used in the analysis for these factors were appropriate.

**(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area**

Timber harvesting

I have reviewed the information regarding utilization standards and the decay, waste and breakage factors assumed in the analysis for the Cassiar TSA and I am satisfied that these factors were appropriately modelled in the analysis.

**(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production**

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

In the timber supply analysis, as described in the March 2001 Cassiar Timber Supply Analysis Report, several management zones were created and different forest cover constraints were applied to the stands in each zone. These management zones—riparian reserve and management, visually sensitive areas, and integrated resource management—were developed to reflect different operational considerations.

I have reviewed the information presented to me regarding the analysis assumptions for domestic watersheds and cultural heritage resources, and I am satisfied that the analysis has appropriately reflected operational constraints within these areas. I am also satisfied that, with the exception of areas noted in the following sections, that the assumptions regarding these factors are appropriately modelled in the analysis. As a result, I will not discuss my considerations of these factors within this rationale document. The factors discussed below are those for which I believe my considerations require some detailed explanation.

- *cutblock adjacency and green-up*

To manage for resources such as water quality, wildlife and aesthetics, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size and shape of cutblocks and maximum disturbances (areas covered by stands of less than a specified height), and prescribe minimum green-up heights required for regeneration on harvested areas before adjacent areas may be harvested. Green-up requirements ensure maintenance of water quality, wildlife habitat, soil stability and aesthetics. Adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscaped.

The cover constraint for cutblock adjacency applied to draft landscape units in the integrated resource management zone permitted no more than 33 percent of each area to be in stands less than three metres tall. A 33 percent permissible disturbance for adjacency is generally equivalent to a 'three-pass' harvesting. In the Atlin supply block a 5-pass system (no more than 20 percent of each area to be in stands less than three metres tall) was applied to account for known high

value caribou habitat that is not yet mapped. Further cover constraints were placed on areas of known wildlife habitat, and these constraints vary from 3-pass to 5-pass systems. I am satisfied that the analysis has adequately modelled cutblock adjacency.

Staff have informed me that there is uncertainty around the number of years for stands to reach green-up (three metres in height) arising from uncertainty in site index estimates. I am mindful that a large portion of the timber harvesting land base is above minimum harvest age. This abundance of mature growing stock provides stability in short-term timber supply against uncertainty, e.g. increases to green-up age. I am satisfied that the uncertainty around green-up does not introduce unacceptable risk to my determination. I encourage staff to review the issue of green-up age as part of clarifying site productivity issues prior to the next timber supply review, particularly as more experience is gained from timber harvesting in the TSA.

*- visual quality objectives*

Visual quality objectives have not been approved for the Cassiar TSA. For the analysis, 12 190 ha were removed from the timber harvesting landbase to account for management for visual requirements throughout the TSA. This was modelled as the removal of a 500-metre buffer applied along each side of Highway 37. Public comment on this factor called for additional protection along waterways with tourism and recreation values like the Iskut and Dease rivers. Other comment was that a 100 percent netdown in the visual corridor along Highway 37 was inappropriate since it limited economic activities on the most accessible and operable timber in the TSA. For this analysis, the visual corridor was used to approximate visual management throughout the TSA and should not be interpreted to be an operational plan that precludes harvesting in any specific area. In other TSAs, visually sensitive areas are managed, not removed from the timber harvesting land base. I understand that the Cassiar Iskut Stikine LRMP has identified areas of visual concern outside of this corridor. In making this determination, I accept that the visual buffer along Highway 37 is a reasonable proxy for visual management in the TSA, and that no adjustments to the base case are necessary. Current practice for applying visual management will be clearer when visual quality objectives are approved in the TSA, and I encourage district staff to establish and approve visual quality objectives prior to the next AAC determination.

*- recreation*

I have reviewed the information regarding recreation, and I am satisfied that the base case assumptions for this factor were appropriate.

*- riparian habitat*

Riparian habitats occur along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones that exclude timber harvesting and riparian management zones that restrict timber harvesting, in order to protect riparian and aquatic habitat. Stream classes described in the Riparian Management Area Guidebook are determined based on the presence of fish, occurrence in a community watershed and average channel width criteria. The stream class is used to estimate riparian reserve zones and riparian management zones.

Staff indicate that there is no stream classification data available for the Cassiar TSA. For the analysis, 33 193 ha were removed from the timber harvesting landbase to model management for riparian areas throughout the TSA. The estimate was derived by identifying streams, lakes and wetlands on digital 1:20,000 forest cover mapping for the Iskut and Boundary timber supply blocks, and digitally applying riparian reserve and management zones to water bodies using widths estimated from Riparian Management Area Guidebook specifications. The proportion of riparian area by Biogeoclimatic variant was then calculated for the Iskut and Boundary timber supply blocks, and extrapolated by similar variant across the remainder of the TSA. A 100 percent netdown was applied for riparian reserve zones and no netdown was applied for riparian management zones.

I have reviewed the information regarding the methodology used in the analysis to account for management practices in riparian habitat. There has been very little operational experience of riparian management in the TSA, and the method is similar to that used elsewhere in the province. In my discussions with staff, the assumption of no netdown in the riparian management zone was based on an assessment of 1998 management practice in the Bulkley TSA, which is administered from the same district office as the Cassiar TSA. Staff acknowledge that this value is low, as current practice in the Bulkley TSA indicates that 5 to 10 percent of the merchantable volume is left intact in the riparian management zone following harvest.

Although there is some uncertainty arising from this method, I am satisfied that it provides a reasonable overall projection of the management in riparian areas. I therefore accept that the best available information was used for this determination. Further operational experience in the TSA will help define riparian area management and I request that staff examine this issue in greater depth for the next analysis for the Cassiar TSA.

The Cassiar Iskut-Stikine LRMP recommends that best riparian management practices be used across the LRMP area. A critical issue analysis examined the timber supply implications of a number of CISLRMP recommendations including an additional two percent reduction of the productive forest to account for the planning table recommendations regarding riparian area management. I will discuss this further under the CISLRMP below.

- *wildlife habitat*

The forests of the Cassiar TSA host a range of wildlife species. Moose are the most common ungulate, but thinhorn sheep, caribou and mountain goats also occur in large numbers. Grizzly bears, black bears, wolverines, lynx and wolves are common.

*1) identified wildlife*

'Identified wildlife' refers to species at risk (red- and blue-listed) and to regionally significant species which are potentially affected by forest management activities and which may not have been adequately accounted for with existing management strategies, such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints. Species at risk as defined under the Forest Practices Code also includes those species that are not considered at risk provincially but which have regional populations that may be threatened. The intent is that by addressing the habitat needs of 'regionally important

wildlife' early on, the possibility that they will become listed provincially as threatened or endangered at a later date may be avoided.

Volume I of the Identified Wildlife Management Strategy was released in February 1999 and details several species which may occur and which require future consideration in the TSA, including the following: bull trout, fisher, grizzly bear, trumpeter swan, and forest nesting raptors. Volume II, which has yet to be released, may identify additional species. The species identified in Volume I will be managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans. No wildlife habitat areas have been established thus far in the Cassiar TSA. The analysis did not explicitly model any requirements for identified wildlife other than forest cover requirements for grizzly bear.

Based on data accumulated on the habitat requirements for the identified species, the estimated impact of management was projected at one percent of the short-term harvest level for the province. Government has committed to limiting the impact of management for identified wildlife to this level in the short-term.

It is not possible in this determination to specify the exact location or precise amount of additional habitat area that will be required within the timber harvesting land base to implement the IWMS. However, given the Province's commitment both to implement the IWMS, and to limit short-term timber supply impacts to one-percent province wide, as well as the expected occurrence of identified wildlife in this TSA, I find it appropriate to account for a one percent impact on timber supply in my determination. I discuss my considerations of this further under 'Reasons for Decision'.

*2) wildlife*

Forest cover requirements were applied in the analysis for caribou, moose, goat, and grizzly bear, and these constraints vary from 3-pass to 5-pass systems. In the analysis, 22.5 percent of the timber harvesting landbase of the Cassiar TSA has been subjected to forest cover requirements for wildlife habitat. A 4 pass system was applied to mapped areas of high value grizzly, goat and moose habitat in the Interior Cedar Hemlock biogeoclimatic zone and mapped areas of high value caribou winter habitat in the Iskut and Boundary and Dease - Liard timber supply blocks. Much of the information used for this mapping interpretation originated from the radio collar studies undertaken by the Spatsizi Association for Biological Research. I have been informed by Forest Service staff and staff from the Ministry of Water, Land and Air Protection (formerly the Ministry of Environment, Lands and Parks) that the scale of mapping used may have caused some site specific, high value caribou habitats to be missed in the analysis. Staff also have informed me that, although the mapping does not yet exist, there are large areas of caribou winter habitat in the Atlin supply block and it is reasonable to expect higher levels of constraint to harvest activities in this area than were applied in the analysis. A 5-pass system was applied to the entire Atlin supply block in the absence of mapped information on high value caribou winter habitat. I consider this to be a very small and unquantifiable impact to timber supply, and I have remained mindful of this in my determination, but I am placing no further weight on it at this time. I expect that ongoing work will be considered at the next determination.

Several submissions from the public expressed concern about wildlife habitat requirements in the TSA. One submission concluded it is important to have vast areas to meet the wintering needs of caribou and to avoid predators. Another expressed concern that the description of threatened species fails to include caribou which they argue is more threatened by logging that any of the other species mentioned.

Since the analysis was completed a study of caribou winter habitat has been completed for the Dease Liard area. Draft results of this study indicate that the area of high value caribou winter habitat is larger than that used in the analysis. At my request, staff undertook further analysis of the impacts of this information. The analysis provided to me indicates that the maximum even-flow harvest level decreases by 7 000 cubic metres per year in the Dease - Liard timber supply blocks when the larger area of caribou habitat is incorporated into the analysis. I am mindful that there is very little timber harvesting history and, hence, operational experience in the Cassiar TSA. I accept that it is appropriate to take into account the implications to timber supply of application of the forest cover constraint to this larger area, and I will discuss my considerations of this further under 'Reasons for Decision'.

*- landscape level biodiversity*

Biological diversity, or biodiversity, is defined as the full range of living organisms, in all their forms and levels of organization. Biodiversity includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at the stand and landscape levels. Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests.

In order to maintain landscape level biological diversity throughout a landscape unit, the *Forest Practices Code* lists targets for the proportion of the area in each biogeoclimatic variant that should be covered by stands with old forest characteristics. Within the Cassiar TSA, biodiversity emphasis options have not been established for each landscape unit. Forest cover requirements for landscape level biodiversity were not applied in the analysis. The large area of forests outside of the timber harvesting land base, comprising 94.6 percent of the forest in the TSA, provide a large reserve to meet most requirements for landscape level biodiversity. To ensure that landscape level biodiversity is accounted for within the timber harvesting land base, a wildlife tree patch requirement of 4 percent was modelled in the analysis. This is higher than that recommended in the *Landscape Unit Planning Guide*.

Public comment on this issue focussed on the importance of biological diversity at the landscape scale. It was suggested that river valleys are biologically rich, contain concentrations of timber harvesting landbase, are heavily used by many types of wildlife, and that harvesting in these areas

could have negative ecological consequences at the landscape scale. I have considered these comments in my determination. I have examined the scattered nature of the timber harvesting landbase, and I am aware of the withdrawals from the timber harvesting landbase for riparian reserve zones and wildlife tree patches, which I believe partially address some of the issues brought forward. I am also aware of the relative size of the timber harvesting landbase in the context of the TSA, and I believe that, with almost 95 percent of the forests of the Cassiar outside of the timber harvesting landbase, the risk to landscape level biodiversity is very low. This is especially true when viewed in the context of the projected harvest levels, which by provincial standards are very small. Accordingly, I have made no adjustments to the analysis for landscape level biodiversity.

*- stand level biodiversity*

Stand-level biodiversity management includes retaining wildlife trees and patches within or adjacent to cutblocks to provide structural diversity and wildlife habitat. Managing for biodiversity is based in part on the principle that this, together with landscape level biodiversity, will provide for the habitat needs of most forest and range organisms.

In the Cassiar TSA, there is little operational experience to define appropriate levels of retention of wildlife trees and wildlife tree patches in stands. In the absence of such experience to define current management, a wildlife tree patch requirement of 4 percent was modelled in the analysis, as discussed above. Staff have informed me that in the boreal white and black spruce biogeoclimatic zone, which makes up 71 percent of the timber harvesting landbase, there will likely be large cutblock blocks which better mimic natural disturbance and that will require wildlife tree patches well in excess of 4 percent. I am mindful that there has been very little harvesting history in the TSA which makes it difficult to specify how much larger wildlife tree patches may be in the future. However, in light of the probable strategy of larger blocks with higher levels of retention I accept that larger wildlife tree patches in the future causes a risk of a small downward pressure to timber supply, and I will discuss this further in 'Reasons for Decision'. Further operational experience in the TSA will help define management of wildlife tree patches and I request that staff examine this issue in greater depth for the next analysis for the Cassiar TSA.

**(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,**

<u>Other information that relates to the capability of the area to produce timber</u>

*- Cassiar Iskut Stikine Land and Resource Management Plan (CISLRMP)*

At the time the base case for the analysis was completed the CISLRMP had not received government approval, hence the base case assumptions did not reflect the CISLRMP. On October 11, 2000 the CISLRMP, which covers about one-third of the TSA, received government approval. When it became apparent that the CISLRMP would be completed prior to the finalization of this determination, Forest Service staff carried out a critical issue analysis of the impacts of the LRMP. In this analysis, harvesting was deferred in the Greater Klappan watershed for a period of 20 years and wildlife tree patches were retained on six percent of the timber harvesting land base instead of four percent in the base case analysis (approximately a one

percent further reduction to the timber harvesting land base). In addition, exclusions for riparian reserve zones staff were increased by 2 percent for increasingly stringent requirements for riparian management (approximately a one percent further reduction to the timber harvesting land base). As well, a 236 hectare reduction was made to the timber harvesting land base to account for newly created parks that fell within the timber harvesting land base. Most of the new parks that resulted from the LRMP were in areas outside the timber harvesting land base.

The CISLRMP critical issue analysis shows that the maximum even-flow harvest forecast of 441 000 cubic metres per year can be maintained for 150 years before declining to a long run harvest level of 437 000 cubic metres per year. In my consideration of this factor, I am aware that incorporating the CISLRMP results in a future decline in timber supply. One of my guiding principles in determining allowable annual cuts is that where I have the flexibility to do so, I will avoid creating a declining timber flow. I am mindful that there has been little harvesting activity in the past few years in the Cassiar TSA and that very little forest industry infrastructure has developed or is dependent on timber harvesting in the TSA. I have concluded that I have the flexibility to avoid creating a declining timber flow at this time. I have closely reviewed the CISLRMP critical issue forecast and find that the estimations of impact of the LRMP to timber supply are reasonable. In order to avoid a declining timber flow, I have considered that the impact will begin in the short term and I have adjusted the maximum even-flow harvest forecast by supply block downward by 4 000 cubic metres per year. I discuss this further under 'Reasons for Decision'.

Staff have identified a further over estimate in the timber harvesting land base as the CISLRMP analysis did not incorporate the LRMP requirement for no timber harvesting in the Little Klappan drainage. The Little Klappan drainage includes approximately 1 464 hectares of timber harvesting landbase, and I have accounted for the removal of this area in my determination.

**(b) the short and long term implications to British Columbia of alternate rates of timber harvesting from the area,**

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

Several harvest forecasts are possible for the Cassiar TSA, given the current management regime and assumptions made in the analysis. In the analysis two alternative harvest flows were examined. In one of the alternatives examined, the initial harvest level could be as high as 634 000 cubic metres per year for one decade before falling by 10 percent per decade to the

maximum even-flow long term harvest level of 441 000 cubic metres per year. The second alternative shows the harvest can be maintained at 485 000 cubic metres per year, ten percent above the maximum even-flow level, for seven decades before decreasing to the maximum even-flow long term harvest level of 441 000 cubic metres per year. Both of these alternatives indicate that the initial harvest level could be set substantially higher than the current AAC without compromising long run sustainability.

While I am aware that the alternative timber supply forecasts suggest that the initial harvest level could be increased, I must consider both the economic and the social consequences of such an increase. The Cassiar TSA has very little timber harvesting and processing infrastructure and capacity. It would be unreasonable to raise expectations and create the situation where infrastructure may be built to support an increased harvest level, only to have that harvest level fall in the immediate future as projected in the alternative harvest flow projections. A more reasonable approach to timber harvesting in the Cassiar is to use an even-flow timber supply forecast as an initial starting point. In this case, there is no projected future decline in timber supply, so expectations and infrastructure can develop under a more stable timber supply forecast. I am also aware that, by choosing an even-flow harvest forecast on which to base my determination, I am assuming that the additional existing timber volume that is available for harvest today will remain and be available for harvest in the future. This will spread the economic and social benefits derived from the forests of the Cassiar across several generations instead of concentrating the economic benefits at the beginning of the planning horizon. In making this assumption, I am aware of and have considered the risk of a major wildfire destroying a portion of this additional existing timber volume.

The maximum even-flow harvest forecast for the TSA projected that a harvest level of 441 000 cubic metres per year could be maintained over the entire 250 year planning horizon. In the analysis, the harvest priority was placed on harvesting the oldest (at or above minimum harvest age) stands first, wherever they are available for harvest on the timber harvesting land base in the TSA. The timber supply computer model has a large amount of flexibility in determining where to harvest stands so as not to violate modelling rules around issues like green-up ages, cutblock adjacency, and forest cover objectives for wildlife. Much of this flexibility arises because of the vast size of the TSA and the dispersed nature of the timber harvesting land base. When the harvest location is restricted on a geographic basis, there is less flexibility for the model to identify stands that meet the harvest criteria and, as a result, the maximum even-flow harvest level decreases.

The Cassiar TSA is vast, covering almost one-sixth of the province. The current AAC is partitioned to three geographical units – the Atlin timber supply block, the Dease - Liard timber supply block and the Iskut and Boundary timber supply block. There are vast distances between these timber supply blocks, and they are home to distinctly different communities and First Nations groups. I am aware that these differences exist and are somewhat unique to the Cassiar. I have reviewed a timber supply forecast prepared by staff that examined the implications to timber supply of restricting the harvest to a maximum even-flow forecast by separate timber supply blocks. The results of the analysis indicate that the sum of the three maximum even-flow harvest forecasts by timber supply block is 416 000 cubic metres per year, or approximately 6 percent less than when the TSA is projected as one supply unit.

Staff have informed me that, compared to the 1994 analysis, the proportion of harvest projected to come from each timber supply block has changed as a result of the newly defined timber harvesting land base. The proportion of harvest attributable to the Atlin timber supply block is now 12 percent, the proportion attributable to the Dease - Liard timber supply block is now 60 percent, and the proportion attributable to the Iskut and Boundary timber supply block is now 28 percent. This redistribution represents a major shift of projected harvesting from the Iskut and Boundary to the Dease - Liard. I have examined the information that gives rise to this shift, particularly the redistribution of the timber harvesting landbase, and I accept that the best available information was used in the analysis.

I have reviewed the alternative harvest forecasts provided and accept that the maximum even-flow forecast by supply block is a suitable reference on which to base my considerations for this determination. I have taken into account the impact on timber supply of establishing a partitioned harvest flow by timber supply blocks, and this is discussed further under 'Reasons for Decision'.

Community implications

I have reviewed the information presented in the socio-economic analysis for the Cassiar TSA. I am mindful that annual harvest activity in the TSA has been fairly sporadic. This results from its remoteness from markets, its lack of infrastructure, and little local demand. The harvest has been well below the AAC, averaging about 45 800 cubic metres per year from 1995 to 1997 to about 1500 cubic metres per year from 1998 to 2000. While this indicates there is a potential to increase forest sector employment through increased harvesting, it also indicates that the timber supply in the TSA is marginally economic. Communities in the TSA are not highly dependent on the forest sector for employment and income as they are elsewhere in the province.

A large number of comments were received from the public concerning the socio-economic analysis. Many of these comments argued that the forest industry does not play a large role in the current economy of the TSA and that wilderness and wildlife in the TSA offered significant future growth potential for the tourism sector.

I have reviewed the many public comments concerning the socio-economic analysis. The socio-economic analysis has two main functions in my determination. First, it provides me with background to the economy of the area and more specifically the current forest industry structure, and second, it provides me with an estimate of the socio-economic implications of the harvest forecasts. This information helps to provide the context for my determination and I am satisfied that the socio-economic analysis has provided the necessary information in that regard.

**(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities;**

Timber processing facilities

*- existing mills*

Almost all of the harvested timber from the TSA is exported out of the TSA for processing in neighbouring TSAs and the Yukon. There are several small, portable mills that periodically supply lumber for local projects.

*- proposed facilities*

I am aware that a non-replaceable forest licence for the harvest of 120 000 cubic metres per year has been offered to the Tahltan First Nation who have established a joint venture with a local logging firm. I am aware that a small processing facility is planned as part of this operation.

**(d) the economic and social objectives of the government, as expressed by the Minister, for the area, for the region, and for British Columbia,**

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Cassiar TSA.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from public input in the timber supply review where these are consistent with government's broader objectives. Many public responses were received on the information report and data package, and on the timber supply and socio-economic analyses. The summary of public input is reproduced in full as Appendix 5.

The Cassiar Iskut Stikine LRMP, the intent of which forms current practice in the Iskut and Boundary timber supply blocks, was approved after several years of public dialogue and negotiation and has been accounted for in this determination. The Cassiar Iskut Stikine Higher Level Plan Order was recently advertised for comment by government, and when established will provide further clarification for some objectives as they continue to be interpreted and implemented.

Local objectives have been an important consideration in my determination of an AAC for the Cassiar TSA. I have considered all public input received on the timber supply review, and where possible I have attempted to respond briefly to this input in this rationale.

**(e) abnormal infestations in and devastation of, and major salvage programs planned for, timber on the area.**

Unsalvaged losses

*- insects and disease*

I have reviewed the assumptions for unsalvaged losses due to insects and disease and I am satisfied that the assumptions used in the analysis are appropriate. I have accepted that an area of previously excluded pulp and balsam stands should now be part of the timber harvesting land base for the TSA. There is now a small offsetting downward pressure to timber supply from unsalvaged losses due to Balsam Bark Beetle, which I have accounted for in my determination.

*- fire*

The forests of the Cassiar TSA vary from fire dominated ecosystems, where the typical natural agents of change in the forest are large, frequent stand initiating wildfires, to coastal and transitional ecosystems where wildfires are rare or infrequent. Fire suppression activities began in the Cassiar TSA in the 1950's, and by the 1970's suppression efforts aimed to extinguish all wildfires. In the late 1970's, suppression efforts were re-evaluated, and from 1980 until the present efforts have been focussed on protecting communities, highways, other infrastructure and commercially valuable timber.

It is difficult and very technically complex to accurately predict future fire impacts to timber, partly due to the nature and number of assumptions that must be made. In the analysis, it was assumed that all losses to fire in the Cassiar TSA are unsalvageable because of the lack of infrastructure (road network) to create immediate salvage opportunities, and the scattered nature of the timber harvesting landbase. It was also assumed that the period of selective suppression from 1980 to 1998 is representative of past fire history and will be representative of future fire occurrence. I note from discussions with staff that only fires of between four hectares and 36 000 hectares were used from this representative period. Fires over 36 000 hectares were deemed to be catastrophic, and were not included in the methodology for determining unsalvaged losses in the base case. During the 19-year period examined, there was one fire larger than 36 000 hectares. This was the EG fire which occurred in 1982 and burned over 180 000 hectares. Fires of this magnitude cannot be accurately predicted, and should a fire of this magnitude occur again, the need to re-determine the AAC will be assessed at that time.

Based on the volume of merchantable timber burned from 1980 to 1998, staff calculated an average annual loss due to fire of 24 108 cubic metres per year. This is the estimate used in the timber supply analysis. The estimate of the average annual loss assumes an average volume of 102 cubic metres per hectare.

I have examined public comment from BC Spaces for Nature and from Cassiar Watch on the issue of wildfire, as well as a report commissioned in 1999 for the Cassiar Iskut Stikine LRMP by the BC Ministry of Environment Lands and Parks. The report, Natural Disturbance and Timber Supply Estimates for the Cassiar Iskut Stikine LRMP, suggests that natural rates of disturbance (in the absence of fire control) characteristic in the LRMP area reduce the rate of sustainable timber harvesting by 25 – 40 percent from levels that might be indicated in an

analysis which does not explicitly model fire losses. I understand that this report was compiled using a timber harvesting landbase and management assumptions that differ significantly from the Cassiar TSA analysis. The report referred to above and the BC Spaces analysis assumed that there was no fire suppression. I must consider current management in this determination, and current management of fires includes active and effective fire suppression. The BC Spaces submission argues that fire suppression increases the amount of dry and dead wood in the forest, which can eventually fuel large fires that cannot be stopped by fire fighting. The submission then uses this argument as a basis for using historical natural fire occurrence for unsalvaged losses in the AAC determination. Although there may be validity to the argument of increased fuel loading as a result of fire suppression, I cannot reasonably base a timber supply reduction on this argument, as current fire suppression is effective. There will most likely be future years where there are numerous fires and large fires, and the commercial timber losses from those fires will be assessed at the time, as described above.

The BC Spaces submission also argues that the average volume of 102 cubic metres per hectare used in the analysis to determine fire losses is too low, and suggests that a more accurate number to use would be 321 cubic metres per hectare, which is the initial average volume harvested by the model. FS staff consider this number to be too high to use in the calculation of fire loss, because most fires will burn in the interior where the volumes are typically lower than the TSA average. The BC Spaces submission does point out that the analysis underestimates the volume burned per hectare on the timber harvesting landbase. Staff have since reassessed this number, and estimate the volume burned to be approximately 200 cubic metres per hectare based on the total growing stock volume divided by the number of hectares of timber harvesting landbase. I consider this estimate to better represents average volume per hectare burned within the timber harvesting landbase across the TSA as it also takes into account fires which burn in stands that have not yet reached minimum harvestable age. Based on an average volume of 200 cubic metres per hectare, the average unsalvaged annual loss to fire increases by 23 092 cubic metres per year to 47 200 cubic metres per year.

I have reviewed the method used to calculate unsalvaged losses due to fire in the base case, and the revised methodology and estimate, and I am satisfied that the revised estimate represents a more prudent estimate of projected losses. I accept the increase in the unsalvaged fire loss estimate as a significant downward pressure on timber supply. I have accounted for additional losses due to fire of 23 092 cubic metres per year in my determination and this is discussed further in 'Reasons for Decision'. I encourage staff to examine this issue in greater depth for the next timber supply review.

**Reasons for Decision**

In making my determination of a new AAC for the Cassiar TSA, I have considered all those factors required to be considered under section 8 of the *Forest Act* (attached as Appendix 1). In those considerations I have been assisted by a number of timber supply projections for the TSA. In deciding among the alternative harvest forecasts I have given my reasons, discussed in alternative rates of harvest, for accepting the maximum even-flow forecast by supply block as a suitable reference on which to base my considerations for this determination. In my accounting of the timber supply impacts from the various factors, I have used the maximum even-flow

harvest forecast for each timber supply block, and have considered quantifiable impacts relative to that forecast.

My considerations in determinations under Section 8 typically serve either to (i) verify the assumptions incorporated in the timber supply analysis and thus the reference forecasts of the timber supply based on these assumptions, or (ii) to identify particular factors which, considered separately, indicate that the timber supply may actually be either greater or less than that projected in the reference forecasts.

For the Cassiar TSA, from my detailed review of the comprehensive information presented to me at the AAC determination meeting for the Cassiar TSA, held in Smithers on June 6 and 7, 2001, from my discussions based on that information, with staff of the BCFS and MELP (now the Ministry of Water, Land and Air Protection), and from my consideration of the summarized public input relevant to this determination submitted through the timber supply review process, I have found the following.

A number of the factors considered were incorporated and represented in the timber supply analyses by data and assumptions that accurately and adequately represent current land use and forest management practices. Those factors which, for this reason, I consider to have been adequately documented earlier, in the data package and information report, the timber supply analysis or the public discussion paper, are identified as such in the preceding sections.

The remaining factors, discussed below, are those that I have identified as indicating some degree of under or overestimation in projected harvest levels. As in most AAC determinations, some of these factors can be quantified and their impacts assessed with reliability, while others may influence the timber supply by introducing an element of risk or uncertainty to the decision, but cannot be quantified reliably at the time of determination. These latter factors are necessarily accounted for in determinations in more general terms.

I have identified the following factors as reasons why the projected timber supply may have been overestimated to degrees that may be quantified. Since the reference forecast is a maximum even-flow projection by supply block, impacts to timber supply apply in all time periods.

1) *operability* – I accept that the timber harvesting landbase used in the analysis is over-estimated. I have distributed a reduction of 19 888 hectares across the supply blocks to account for the scattered and isolated nature of the timber harvesting land base. I have also accepted that there are inaccuracies in the mapping of the timber harvesting land base that results in an impact of 4.4 percent to timber supply. I have accounted for an increase in the timber harvesting land base of 8 615 hectares to account for pulp stands and 8 153 hectares of balsam leading stands to account for including pulp in the harvest profile and to correct an omission in the analysis. These increases are attributed solely to the Iskut and Boundary supply block. A final reduction in land base that I have accounted for is 1 645 hectares from the Atlin supply block which have been removed because of an oversight in the analysis. I have determined that, altogether, changes in the timber harvesting land base act to reduce timber supply by approximately 6.5 percent.

2) *existing stand volume estimates* – The inventory audit indicates that existing stand volumes may be over-estimated. I am aware that there is a great deal of uncertainty in the re-stratified audit. I have reviewed the analysis undertaken by the staff, which indicates a 16 percent reduction in the maximum even-flow forecast when the inventory audit results are used to adjust estimates of existing stand volumes. I have noted that the majority of the impact of the audit is applicable to the interior biogeoclimatic zones. I have considered the magnitude and the trend of the audit information, however I must also consider the relatively high level of uncertainty contained within the audit information. The uncertainty represented by this factor suggests that if the audit findings do not directly apply then no adjustment should be made. At another extreme, if they do apply fully, even though it is difficult to prove that from existing data, then a 16 percent reduction would be in order. I feel obliged to somehow account for the risk that volumes are over-estimated, but accept that the range of uncertainty represented by this factor is between zero and 16 percent. As it is impossible to know if either extreme represents the most probable outcome, I am accounting for this factor by placing weight on the middle of the range as representing a balanced approach to accounting for the risk of uncertainty with respect to existing stand volumes. Accordingly, I have determined that an over-estimate of existing stand volumes identified by the inventory audit accounts for a downward pressure on timber supply of approximately 8.5 percent which I have allocated by supply block.

3) *operational adjustment factors*– I have reviewed the results of the study completed on gap disturbances in northern old-growth forests in British Columbia, and I have accepted that the OAF 1 is underestimated by 3 percent. On this account, the timber supply has been overestimated by approximately 3 percent and I have distributed this impact proportionately by supply block;

4) *identified wildlife management strategy* – I accept that the implementation of the IWMS will result in a downward impact to timber supply in the TSA of up to 1 percent, and I have distributed this impact proportionately by supply block.

5) *wildlife* - I have reviewed and accept the additional analysis of caribou winter habitat and the implications for timber supply. Accordingly, I have accounted for a decrease to timber supply of 7 000 cubic metres per year, or approximately 1.7 percent, which applies entirely to the Dease - Liard timber supply block.

6) *Cassiar Iskut Stikine LRMP* – I am satisfied that it is appropriate to removed 1 464 hectares from the timber harvesting land base in the Iskut supply block to account for the LRMP requirement to exclude the Little Klappan drainage from timber harvesting. I accept that implementation of the LRMP, including exclusion of the Little Klappan drainage, will result in a downward pressure on timber supply of approximately 1.7 percent which applies entirely to the Iskut and Boundary supply block.

7) *alternative rates of harvest* – I accept that distinct differences and the wide separation of timber supply blocks in the TSA reduces the flexibility that otherwise would exist to move harvest location between geographic areas. My determination is based on a partition of harvest by timber supply block. The sum of the maximum even-flow forecasts by timber supply block is 416 000 cubic metres per year for the TSA, and represents a 6 percent impact to timber supply compared to the maximum even-flow forecast for the TSA as a single

supply unit and is distributed across supply blocks based on the maximum even flow for each block, (i.e. 116 000 cubic metres Iskut and Boundary, 250 000 cubic metres Dease – Liard, and 50 000 metres Atlin).

8) *unsalvaged losses due to fire*– I accept that the unsalvaged losses due to fire have been underestimated in the analysis as a result of the low volume per hectare estimate used. There is a significant level of uncertainty surrounding the calculation of fire losses, however, I find it reasonable to acknowledge that the fire losses in the Cassiar are likely higher than estimated in the analysis. I consider it appropriate to recognize an increase in unsalvaged fire losses of approximately 23 092 cubic metres per year which corresponds to an 5.5 percent decrease in the projected maximum even-flow harvest forecast by timber supply block. I have distributed these fire losses proportionately by timber supply block.

The following factors have been identified in my considerations as reasons why the timber supply projected in the reference forecast may have been underestimated to a degree that may not be readily quantified with reliability:

- *wildlife* –There are indications that the scale of mapping used may have caused some small, site specific high value wildlife habitat to be overlooked, and I have considered this risk in my determination.
- *Stand level biodiversity* – Wildlife tree patches in the boreal white and black spruce biogeoclimatic zone may exceed 4 percent in areas of aggregated cutblocks, and I have considered this risk to timber supply in my determination.
- *Unsalvaged losses due to insects*- I have accepted an increase in the component of Balsam stands contributing to the AAC, and there is now a small downward pressure to timber supply from unsalvaged losses due to Balsam Bark Beetle. I have considered this in my determination.

## Determination

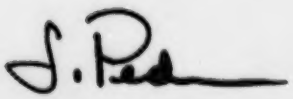
I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years and that reflects reasonable management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Cassiar TSA by establishing an AAC of 305 000 cubic metres per year. This reduces the AAC for the TSA by 23.8 percent. Within the AAC of 305 000 cubic metres, partitions are attributable to the three timber supply blocks as follows: Dease – Liard, 153 000 cubic metres; Atlin, 32 000 cubic metres; and, Iskut and Boundary, 120 000 cubic metres.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

## Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Cassiar TSA. Several of these issues will become clearer as harvesting operations commence. I recommend that district staff:

- Review the economic and physical operability of timber within the TSA
- Clarify site productivity issues and associated issues of green-up age by reviewing SIBEC and inventory data
- Review cutblock adjacency issues
- Proceed with establishing and approving VQO's across the TSA
- Better define riparian area management
- Better define management of wildlife tree patches
- Explore methods to more accurately predict unsalvaged losses due to fire



Larry Pedersen
Chief Forester

November 7, 2001

## Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, reads as follows:

### Allowable annual cut

**8.** (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silvicultural treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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## Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

### Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

   (a) encourage maximum productivity of the forest and range resources in British Columbia;

   (b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

   (c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

   (d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

   (e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

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**Documents attached:**

**Appendix 3:** Minister of Forests' letter of July 28, 1994

**Appendix 4:** Minister of Forests' memo of February 26, 1996

**Appendix 5:** Summary of Public Input

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

**Re: Economic and Social Objectives of the Crown**

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

# MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: **The Crown's Economic And Social Objectives Regarding Visual Resources**

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

# Cassiar Timber Supply Area
# Timber Supply Review

## Summary of Public Input

BC Ministry of Forests
Bulkley/Cassiar Forest District
Bag 6000
3333 Tatlow Rd.
Smithers, BC
V0J 2N0

**November, 2001**

This is a summary of the public input received on the Timber Supply Review in the Cassiar Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

# Cassiar Timber Supply Area

## Background

As part of the review of timber supply in the Cassiar Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Cassiar TSA *Data Package* and *Information Report* in November 1999. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Cassiar TSA. A 30-day review period, ending December 31, 1999, was provided for the public to comment on these documents.

On March 13, 2001, the British Columbia Forest Service released the *2001 Cassiar Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 80-day review period that ended May 31, 2001.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the allowable annual cut (AAC) for the Cassiar TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Bulkley/Cassiar Forest District office.

## Public Review Process and Response

Cassiar District staff actively solicited public input on the Timber Supply Review in the Cassiar TSA through the following actions:

- approximately 250 copies of the *Information Report, Data Package, Public Discussion Paper* and *Analysis Report* were mailed to stakeholders in the TSA and around the province, such as First Nations, licensees, environmental groups and local governments. Meetings or presentations were offered.
- the *Data Package* and *Analysis Report* were available at the Bulkley/Cassiar district office in Smithers, the Prince Rupert regional office in Smithers, and the field office in Dease Lake. Approximately 10 copies were picked up. The documents were also available on the Ministry of Forests website.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- copies of all the documents were made available to the local media. One interview was conducted with CBC radio.
- open houses on the *Analysis Report* were held in Iskut, Dease Lake and Telegraph Creek on April 17th and 18th, 2001, (17 participants) and in Atlin on May 18th, 2001, (one participant).
- presentations on the *Analysis Report* were made to representatives from Lower Post and Good Hope Lake on March 13th, 2001.

The Cassiar Forest District received 19 written submissions on the *Data Package* and 14 submissions on the *Analysis Report* (see Appendix 1).

## Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Cassiar TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report (and Public Discussion Paper)
- Other comments

## Data Package

### Land Base Factors

A submission from Cassiar Forest Watch questions what scale maps were used to identify operable areas, while Skeena Cellulose questions the exclusion of areas with slopes greater than 35 per cent. The company says in adjacent TSAs ground-based harvesting is common on slopes well over 35 per cent.

Skeena Cellulose questions the economic feasibility of harvesting stands with less than 150 cubic metres per hectare. The company says that in most areas of the province, harvesting is marginal under 200 cubic metres per hectare.

Skeena Cellulose also says the netdowns for roads, trails and landings are based on 1994 figures, prior to implementation of the Forest Practices Code, and need to be reviewed.

Three submissions ask various questions about the application of Environmentally Sensitive Areas (ESAs), including:

- are the 39 forest cover maps with ESA designations representative of all 1181 forest cover maps in the TSA?
- why has there been no new mapping of ESAs since 1994?
- why are there no ESAs for wildlife that result in a reduction in harvesting?
- where is the data to support the statement that most Es2 areas (with sensitive soils) are harvestable and treatable with past silviculture practices?

The Canadian Parks and Wilderness Society – Yukon Chapter (CPWS) states their support for the completion of a protected areas network, including special management zones, in northern BC and the Yukon. The society says it's premature to assess available timber supply until these areas and other conservation needs are identified in the transboundary region, and provides a list of areas of interest.

### Expected Rate of Growth

An individual submission asks for the rationale for not adjusting operational adjustment factors (OAFs) to reflect northern growing conditions.

### Forest Cover Requirements

Cassiar Forest Watch says they have not seen the scientific basis for achieving forest cover requirements with low biodiversity forest areas, noting that a high biodiversity-low elevation corridor also meets required interior forest conditions.

Skeena Cellulose says areas classified as non-commercial cover should contribute to forest cover requirements, as do non-forest areas. The company notes the "aggregate" method of harvesting practiced in the Bulkley TSA, saying this may allow a smaller number of passes with larger openings to achieve patch size and seral stage distributions.

### Visually Sensitive Areas

Skeena Cellulose says it's inappropriate to limit economic opportunities by creating a 500-metre no-harvest buffer on either side of Hwy 37. The company says this is the most accessible and most operable timber in the TSA, and notes that in other TSAs visually sensitive areas are managed not removed from the timber harvesting land base. An individual submission says the buffer along Hwy 37 is important but needs to be

flexible to achieve visual quality objectives.

The same individual says this protection is also important along waterways with tourism and recreation values, while another submission questions who determined that no visual quality objectives need to be established for areas in the Cassiar, as stated in the *Data Package*. Cassiar Forest Watch says a critical analysis is needed based on the direction for roads and rivers from the Cassiar-Iskut-Stikine Land and Resource Management Plan (LRMP).

### Riparian Management

Skeena Cellulose says there is an error in the reductions applied to riparian reserve zones alongside small streams, and an adjustment is needed.

An individual questions the methodology used to establish riparian zones and says provisions are needed for possible reductions to the timber harvesting land base pending completion of the stream inventory. Adjustments are also needed to protect oolichan, according to this submission.

Cassiar Forest Watch states their disagreement with the lack of any netdown in riparian management zones.

### Wildlife Management

One individual expresses concern about the impact of increased road access on wildlife, and the consequences for guide-outfitters. Another says it's unacceptable that no land base adjustments for wildlife habitat are planned. A third submission says lumping grizzly bear and goat habitat needs together is puzzling and asks if the guidelines apply only to the Interior Cedar-Hemlock Zone. Cassiar Forest Watch notes that a great deal of isolated, high-value wildlife habitat doesn't show on broad scale maps.

### Caribou Management

One submission says that after 30 years of guide-outfitting in the Spatsizi area and having participated in two major caribou studies, they're able to see the need for vast areas to meet the wintering needs of caribou and to avoid predators. This submission compliments the Ministry of Forests for recognizing the importance of forests for wildlife (in the LRMP process) and supporting "no logging zones" in areas of high ecological values.

Another individual says the description of threatened species fails to include caribou which are arguably more threatened by logging than any of the other species mentioned. Specific concerns about wildlife habitat areas (WHAs) for caribou include ensuring:

- the minimum percentage of area in stands older than 140 years;
- minimizing fragmentation of habitat;
- connectivity between seasonal ranges; and
- the ability of soils to regenerate lichen growth.

### Biodiversity

An individual expresses the opinion that there is an opportunity in the Cassiar, where the forest industry is not entrenched, to make maintenance of biodiversity and the integrity of indigenous ecosystems a cornerstone of forest management. This submission says it is dangerous to assume objectives for non-timber values can be achieved outside the timber harvesting land base, because much of the harvesting will occur in the biologically rich river valleys or in pine forests that are important habitat.

Cassiar Forest Watch says wildlife tree patches (WTPs) plus forest cover requirements do not fully address landscape biodiversity issues. Of particular concern is the need to maintain the interior conditions of forests; this submission suggests a reduction in the timber harvesting land base to ensure the widths necessary to preserve interior forest species and connectivity.

An individual expresses concern about the assumption that WTP requirements can be met, at least in part, by riparian habitat areas and other non-timber harvesting land base areas. This submission points out that non-colonial bird species generally space themselves territorially and restricting pairs to confined areas is unlikely to maintain populations.

### Heritage Resources

One individual says it's objectionable there will be no adjustments for cultural heritage resources, including traplines and the Telegraph Trail. Two submissions note the designation of the Stikine River as a heritage river, and one suggests logging near it should be deferred until management guidelines are completed.

### Unsalvaged Losses

An individual says that considering natural agents such as pests, fire and wind as "losses" is an example of management thinking geared solely to human economic benefits.

### Cassiar-Iskut-Stikine LRMP

Five submissions comment on the work of the Cassiar-Iskut-Stikine LRMP. Three say this work should take precedence over and be completed prior to the Timber Supply Review. Of particular concern are candidate protected areas, according to two submissions.

### First Nations

One individual asks how is it possible to reconcile industrial resource extraction while the Tahltan aboriginal question remains outstanding. Four submissions say there was a lack of proper and meaningful consultation with First Nations.

The ShaKlink Family of the Tahltan Nation says the Timber Supply Review process contravenes domestic and international law, and the Ministry of Forests and the Tahltan Nation must become partners in determining any AAC in their territory.

The Teslin Tlingit Council asserts aboriginal title over a portion of the land in the TSA and is in land claims negotiations. The Council says the Ministry of Forests neglected to include them in its consultation strategy and urges the ministry to begin the process of properly and meaningfully consulting.

The Carcross/Tagish First Nation says Yukon First Nations with transboundary traditional territories were not consulted appropriately and fairly, and the timing and timelines of the public input period were a problem. The lack of an LRMP to oversee the Timber Supply Review and balance other values is also a concern, according to this submission.

### Socio-Economic Factors

Seven submissions comment on the socio-economic factors considered in the Timber Supply Review. The main comments include:

- tourism provides substantially more economic benefit to the region than forestry does, and will continue to do so.
- the protection of biodiversity and the region's wildlife/wilderness values has more potential social and economic benefits than can be derived from timber.
- the local needs and opportunities identified in the LRMP should be the basis for decision-making.
- priority should be given to a small-scale, locally-beneficial forest industry that processes wood in the region, and not to maximizing fibre supply to southern mills.
- industrial scale harvesting is not the best option, and has been a hard sell with the community compared to mining, trapping, tourism, guide-outfitting, and road construction and service jobs.
- wood from the Cassiar TSA is important to mills in adjacent TSAs.

## Timber Supply Area Analysis Report

### Land Base Factors

The Tahltan Land Use Office (the Tahltans) says most of the remaining operable timber is fragmented and an economic analysis is needed with respect to accessing these timber "islands" before deciding whether to include or exclude them from the timber harvesting land base.

The Tahltans question the exclusion of pulp quality stands based on a lack of harvesting history, and provide examples of harvesting in similar stands in recent years. This submission says the Tahltans would like management rights over these stands if they're not included in the timber harvesting land base, as well as an area-based tenure covering the Iskut and Boundary Supply Block and other areas of traditional territories.

BC Spaces for Nature (BC Spaces) notes an apparent contradiction in the *Analysis Report* where it says the total timber harvesting land base impact of the LRMP is one per cent, yet also states there will be a one per cent land base reduction for both WTPs and riparian protection. BC Spaces also expresses support for deferring the Klappan watershed under Part 13 of the *Forest Act*.

### Biodiversity and Wildlife

An individual submission says the management direction for grizzlies and caribou developed by the LRMP table should be applied to the entire Cassiar TSA.

BC Spaces says the assumption that forests outside the timber harvesting land base can meet most biodiversity objectives is flawed, for the following reasons:

- wildlife habitat occurs in and out of the timber harvesting land base, and relying on non-timber harvesting land base forests to provide habitat is unlikely to maintain critical habitat inside the timber harvesting land base.
- the timber harvesting land base is concentrated in individual valleys and liquidating the commercial forest in a specific valley could have ecological consequences.

### Fire Losses

The CPWS says the methodology used to estimate annual losses to forest fires is flawed; the Forest Service must take a more accurate measurement and adjust the AAC accordingly.

Cassiar Watch also says the analysis fails to account adequately for re-occurring natural wildfire and provides details of projections they have made based on the actual volume of timber that burnt during a recent 25-year period on the Iskut Supply Block harvesting land base.

BC Spaces outlines two concerns with the methodology used to estimate fire losses:

- no estimate was made of the frequency of catastrophic fires.
- it's inaccurate to assume the area burned on the timber harvesting land base has the same volume of timber as forest burned outside the timber harvesting land base; this approach underestimates fire losses.
- BC Spaces proposes an alternative approach.

### Partition

The regional district director for Area D expresses concern that the entire AAC not come from the Iskut and Boundary Supply Block. He is also concerned that adequate land use planning and inventory have still not been done for the Dease/Liard and Atlin blocks, and the opportunity for local benefits and capacity-building has not yet developed there.

Cassiar Watch says the living timber supply from the Iskut Supply block has been greatly overestimated while fire salvage potential has been underestimated. The group recommends a

low area-based AAC for the Iskut block, and a focus on additional fire salvage harvesting and on non-timber forest outputs.

### Socio-Economic Factors

Five submissions comment on socio-economic factors relating to the Timber Supply Review. The main comments include:

- the socio-economic considerations and objectives are well-considered.
- the *Socio-Economic Analysis (SEA)* overestimates the forest sector's regional economic importance. E.g., employment numbers include Cassiar residents who work in neighbouring TSAs, leading to an overstatement of the Cassiar forest sector's contribution to the local economy.
- it's important to consider the growing tourism industry (including guide-outfitting), its socio-economic impacts and how it's affected by increasing the AAC.
- high subsidies and/or raw log exports would be required to support an increased harvest, and these would negate other socio-economic benefits.
- there are no studies that calculate the overlap between tourism and the timber harvesting land base to confirm the chief forester's contention of coexistence.
- increased costs are not considered in the *SEA* (e.g., fire suppression, administration).
- calculations of future revenues to the province are severely flawed. E.g., the anticipated forest licence in the Iskut has a stumpage of 25 cents per cubic metre compared to the average $35.69 per cubic metre used in the *SEA*.
- the LRMP requires that benefits from forestry should accrue to local communities. The assumption that residents could get about 20 per cent of the direct employment from a fully-utilized AAC is inadequate.
- all LRMP references to forestry stress small-scale and local need. There is no mandate to initiate large-scale commercial logging that exports timber from the region or province.

Cassiar Watch says most of the current locally-driven Iskut Valley forest economy occurs in the early seral forests of the valley's burns. Examples are provided of economic activities based on the fire cycle, ranging from fire fighting to mushroom and berry picking and salvage of fire-killed timber.

## Other Comments

Most submissions comment on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

### Timber Supply Review Process

Nine submissions comment on the Timber Supply Review process. The major points include:

- the shortage of data in this TSA must be addressed.
- the time allowed and timeline for review of the *Data Package* are a problem (just prior to Christmas season). The data gaps in the document are noted.
- the process appears to be very thorough.
- the analysis is a great improvement over 1996 but the approach is inherently flawed. It's designed to determine how much timber can be cut without weighing timber values against other forest values. The *Analysis Report* reads as though timber is the primary value in this TSA.
- the assumptions fall short of objectivity and science, and pave the way for an increase in timber supply and AAC.
- the Timber Supply Review should be approached at a community-forest level.
- various local initiatives arising from the

LRMP must be completed before setting an AAC.

### Harvest Levels

Many submissions commented on the harvest level for the Cassiar TSA:

- the AAC for the Atlin area should remain the same.
- 400,000 cubic metres per year is adequate for the short term, given unproven regeneration rates, wildlife needs, market demands and benefits of the undeveloped wilderness sector.
- any AAC above 125,000-150,000 cubic metres and for regional use is not justifiable. Cassiar is renowned for values other than timber; why jeopardize them with roads and clearcuts for the marginal gains from harvesting slow-growing boreal timber.
- given downward pressures and uncertainty about fire history, an AAC between [illegible].000 and 140,000 cubic metres would best reflect an ecologically sustainable AAC.
- the AAC should be reduced significantly or to zero as the potential costs to biodiversity and wilderness-based tourism exceed the marginal benefits to local economic development. More roadbuilding will dissect one of the last unroaded areas of the world, increasing environmental risks.
- the AAC must be reduced to reflect the current situation (market and social forces). The volume harvested has not approached the AAC in recent years.
- the timber harvesting land base has been reduced by half, which suggests harvesting will be twice as intensive on land that is also high value habitat for some wildlife.

Several downward pressures on timber supply are identified. These include completion of the LRMP and uncertainty about fire losses, inventory volume estimates, productivity estimates and the effects of climate change.

### Allocation

Several submissions say the majority or all of the AAC should go to small, value-added operators with a record in the area, in order to maximize local employment creation. Given all the uncertainties outlined in the *Analysis Report*, long-term forest tenures are not recommended.

### Management Practices

One submission says the experience and science necessary to support industrial forestry in northern BC does not exist and the northbound continuation of current forest practices will have a significant and possibly devastating effect on the 'quality of life' of all creatures in the Cassiar TSA.

Skeena Cellulose says since there has been little harvesting in the Cassiar TSA, current management practices could be derived from nearby TSAs, especially the Bulkley TSA which is under the management direction of the same district office.

Cassiar Forest Watch recommends the Ministry of Forests assume or encourage a new direction in management that includes area– rather than volume-based management, more community ownership rather than capital ownership and ecosystem-based management.

# Appendix 1

## Submissions received by the Cassiar Forest District

### Submissions received on the Data Package

#### First Nations

ShaKlink Family, Tahltan Nation, Dease Lake
Carcross/Tagish First Nation, Carcross YT
Teslin Tlingit Council, Teslin YT

#### Forest industry

Atlin mill operator
Skeena Cellulose Inc., Terrace

#### Interest groups

Canadian Parks and Wilderness Society, Yukon Chapter, Whitehorse YT
Cassiar Forest Watch
Friends of the Stikine, Smithers
Redfern Resources, Vancouver
Spatsizi Wilderness Vacations, Smithers
The Bike, Hike & paddle Co. (2 submissions)
Wolf Creek Lodge, Iskut

#### General public

6 individual submissions

### Submissions received on the Timber Supply Analysis Report

#### First Nations

Tahltan Joint Councils – Land Use Office

#### Local government

Regional District of Kitimat-Stikine
Regional District of Kitimat-Stikine

#### Interest groups

BC Spaces for Nature
Cassiar Watch
Canadian Parks and Wilderness Society, BC chapter
Out-Yonder Productions

#### Consultants

RRL Recreation Resources Ltd.

#### General public

6 individual submissions